

**No. 15-1489**

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IN THE UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

SIERRA CLUB,  
*Petitioner,*

v.

UNITED STATES DEPARTMENT OF ENERGY,  
*Respondent, and*

FREEPORT LNG EXPANSION, L.P.,  
FLNG LIQUEFACTION, LLC,  
FLNG LIQUEFACTION 2, LLC,  
FLNG LIQUEFACTION 3, LLC, and

AMERICAN PETROLEUM INSTITUTE,  
*Intervenors for Respondent.*

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On Petition for Review of the Department of Energy Office of Fossil Energy  
Orders 3357-B (Nov. 14, 2014) and 3357-C (Dec. 4, 2015);  
DOE/FE Docket No. 11-161-LNG

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**[PROOF] ANSWERING BRIEF FOR RESPONDENT  
DEPARTMENT OF ENERGY**

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**CERTIFICATE AS TO PARTIES,  
RULINGS, AND RELATED CASES**

Pursuant to Circuit Rule 28(a)(1), the undersigned counsel certifies as follows:

**A. Parties and Amici**

The parties and amici appearing on this petition for review are:

- (1) Sierra Club, Petitioner
- (2) United States Department of Energy, Respondent
- (3) Freeport LNG Expansion, L.P.  
FLNG Liquefaction, LLC  
FLNG Liquefaction 2, LLC  
FLNG Liquefaction 3, LLC, *Intervenors for Respondent*, and
- (4) American Petroleum Institute, *Intervenor for Respondent*.

**B. Ruling under Review**

Petitioner seeks review of two orders of the Department of Energy (“DOE”):

- (1) Final Opinion and Order Granting Long-Term Multi-Contract

Authorization to Export Liquefied Natural Gas by Vessel From the Freeport LNG Terminal on Quintana Island, Texas to Non-Free Trade Agreement Nations; DOE/FE Order No. 3357-B (Nov. 14, 2014); and

- (2) Opinion and Order Denying Request for Rehearing of Orders

Granting Long-term, Multi-Contract Authorization to Export Liquefied Natural

Gas by Vessel from the Freeport LNG Terminal on Quintana Island, Texas, to Non-Free Trade Agreement Nations; DOE/FE Order No. 3357-C (Dec. 4, 2015).

**C. Related Cases**

Petitioner Sierra Club has filed four petitions in this Court for review of orders by the Federal Energy Regulatory Commission (“FERC”) that relate to the Department of Energy’s orders at issue in this petition or involve similar issues. Those petitions are:

(1) *Sierra Club v. FERC*, D.C. Cir. No. 14-1275, argued on **November 13, 2015**, which involves an order by FERC that authorized the construction and operation of natural-gas liquefaction facilities at the Freeport Terminal on Quintana Island, Texas, the same project at issue in the present petition. In both petitions, Sierra Club challenges the adequacy of the Environmental Impact Statement (“EIS”) prepared by FERC under the National Environmental Policy Act (“NEPA”) and adopted by DOE as a cooperating agency.

(2) *Sierra Club v. FERC*, D.C. Cir. No. 14-1249, argued on **November 13, 2015**, which involves an order by FERC that authorized the construction and operation of the natural gas liquefaction facilities at the Sabine Pass Terminal in Cameron Parish, Louisiana. The petition raises environmental-review issues similar to those at issue in the present petition.

(3) *Sierra Club v. FERC*, D.C. Cir. No. 15-1127, argued on **April 19, 2016**, which involves an order by FERC that authorized the construction and operation of natural-gas liquefaction facilities at Cove Point in Calvert County, Maryland. The petition raises environmental-review issues similar to those at issue in the present petition.

(4) *Sierra Club v. FERC*, D.C. Cir. No. 15-1133, not yet argued, which involves an order by FERC that authorized the construction and operation of natural-gas liquefaction facilities at a proposed terminal in Corpus Christi, Texas. The petition raises environmental-review issues similar to those at issue in the present petition.

Respectfully submitted,

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## **GLOSSARY OF ACRONYMS & ABBREVIATIONS**

AR.....	administrative record
Bcf/d.....	billion cubic feet per day
Bcf/yr .....	billion cubic feet per year
CEQ .....	Council on Environmental Quality
CH <sub>4</sub> .....	methane
CO <sub>2</sub> .....	carbon dioxide
DOE .....	Department of Energy
DOE/FE .....	Department of Energy Office of Fossil Energy
EIA.....	U.S. Energy Information Administration
EIS .....	Environmental Impact Statement
EPA.....	Environmental Protection Agency
FERC .....	Federal Energy Regulatory Commission
FTA.....	free trade agreement
FLEX .....	Freeport LNG Expansion, L.P., <i>et al.</i>
JA .....	Joint Appendix
LNG .....	liquefied natural gas
MWh .....	megawatt hour
NEPA.....	National Environmental Policy Act
NEMS .....	National Energy Modeling System

NETL .....National Energy Technology Laboratory

NO<sub>x</sub>..... nitrogen oxides

VOC .....volatile organic compounds

## **STATEMENT OF JURISDICTION**

Petitioner Sierra Club seeks review of two orders of the Department of Energy (“DOE”) under Section 3(a) of the Natural Gas Act (15 U.S.C. § 717b(a)): (1) a November 14, 2014 order (DOE/FE Order 3357-B), authorizing Freeport LNG Expansion, L.P., *et al.*, (“FLEX”) to export liquefied natural gas (“LNG”) from the Freeport Terminal on Quintana Island, Texas, to nations with which the United States has not entered a free trade agreement (“FTA”) requiring national treatment for trade in natural gas, in an amount equivalent to 0.4 billion cubic feet of natural gas per day, and (2) a December 4, 2015 order (DOE/FE Order 3357-C) denying rehearing of the November 14, 2014 order. Sierra Club timely filed a petition for review on December 22, 2015. JA \_\_\_. This Court has jurisdiction under 15 U.S.C. § 717r(b).

## **ISSUES PRESENTED**

1. Whether DOE took a “hard look,” under the National Environmental Policy Act (“NEPA”), at the environmental impacts of authorizing LNG exports from the Freeport Terminal to non-FTA countries and whether DOE reasonably determined, based on multiple uncertainties in domestic and foreign energy markets, that it could not meaningfully forecast specific indirect and cumulative environmental effects from: (1) potential increases in domestic natural-gas

production; (2) a potential shift to domestic coal consumption; and (3) the foreign consumption of exported LNG.

2. Whether DOE reasonably determined, under Section 3(a) of the Natural Gas Act (15 U.S.C. § 717b(a)), that potential adverse environmental impacts do not render LNG exports from the Freeport Terminal inconsistent with the public interest.

## **STATEMENT OF THE CASE**

### **A. Introduction**

Due to new production techniques, the United States has recently become the world's leading producer of natural gas.<sup>1</sup> The abundance of natural gas in the United States has prompted several companies to pursue projects to liquefy natural gas for export to foreign markets by vessel. *See* AR<sup>2</sup> 44 at 3-4 & n. 12, JA \_\_-\_\_. In this petition for review, Sierra Club challenges a final DOE order granting a 2011 application by FLEX requesting authority to export LNG to non-FTA nations from a liquefaction plant and related facilities to be constructed on Quintana Island, Texas. DOE granted the 2011 application in an amount equivalent to 0.4 billion cubic feet per day ("Bcf/d"), after conducting an extensive public-interest review under Section

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<sup>1</sup> *See* <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=3&pid=26&aid=1>.

<sup>2</sup> Administrative Record ("AR") citations are to the documents listed in the corrected certified index (May 23, 2016).



3(a) of the Natural Gas Act and finding insufficient record evidence to rebut the statutory presumption that the proposed exports are in the public interest.<sup>3</sup>

Sierra Club contends that DOE failed to take a hard look under NEPA at greenhouse-gas emissions and other impacts that might result from increased domestic natural-gas production and from foreign consumption of U.S.-exported LNG. As explained *infra*, given the many uncertainties affecting the domestic and international energy markets, DOE reasonably determined that potential environmental effects specifically attributable to export-induced natural-gas production are too speculative to be reasonably forecast and meaningfully quantified for NEPA purposes. As part of its public-interest review under Section 3(a) of the Natural Gas Act, however, DOE prepared an “Environmental Addendum” to evaluate and disclose air, water, seismicity, and other impacts associated with natural-gas production, and a “Life Cycle Analysis” to evaluate and disclose the impact of LNG exports on global climate change. DOE’s review constituted the “hard look” required by NEPA and provided a reasonable basis for DOE’s determination under Section 3(a) that the potential adverse environmental impacts do not render the proposed exports contrary to the public interest.

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<sup>3</sup> DOE concurrently granted FLEX’s 2010 application for like authority to export LNG to non-FTA nations in an amount equivalent to 1.4 Bcf/d. *See* AR 79 at 2 n.10, JA \_\_\_. Sierra Club did not participate in the proceedings on FLEX’s 2010 Application (DOE/FE Docket 10-161) and does not seek review of that order. *See* pp. 6-7, *infra*.

## **B. Preliminary Proceedings**

### *1. Natural Gas Act*

Congress enacted the Natural Gas Act in 1938. *See NAACP v. Fed. Power Comm’n*, 520 F.2d 432, 438 (D.C. Cir. 1975). The Act authorized the then-existing Federal Power Commission to regulate the interstate sale and transportation of natural gas, and natural-gas imports and exports, for the primary purpose of protecting consumers from anticompetitive practices. *Id.*; *see also Fed. Power Comm’n v. Hope Natural Gas Co.*, 320 U.S. 591, 610 (1944); *W.Va. Public Servs. Comm’n v. U.S. Dept. of Energy*, 681 F.2d 847, 855 (D.C. Cir. 1982). In 1977, Congress enacted the Department of Energy Organization Act, creating DOE and FERC and transferring the Federal Power Commission’s authorities to those agencies. *See La. Ass’n of Indep. Producers v. FERC*, 958 F.2d 1101, 1120 (D.C. Cir. 1992). DOE’s Office of Fossil Energy now administers Section 3(a) of the Natural Gas Act, which governs import/export authorizations, while FERC administers Section 3(e), which governs terminal siting authority, and other provisions. *See La. Ass’n of Indep. Producers*, 958 F.2d at 1120.

Section 3(a) requires DOE approval for the import or export of natural gas, but provides that DOE “shall” grant such authority, “unless, after opportunity for hearing, [DOE] finds that the proposed exportation or importation will not be consistent with the public interest.” 15 U.S.C. § 717b(a). Section 3(c) states that,

the importation or exportation of natural gas “shall be deemed \* \* \* consistent with the public interest” and “applications for such importation or exportation shall be granted without modification or delay” as to nations “with which there is in effect a free trade agreement requiring national treatment for trade in natural gas.”<sup>4</sup> *Id.*

§ 717b(c). Thus, as to the specified FTA nations, export authorization is mandated, *id.*, and as to non-FTA nations, there is a “general presumption favoring \* \* \* authorization.” *See W.Va. Public Servs. Comm’n*, 681 F.2d at 856.

In 1984, DOE published guidelines to govern authorization of natural gas imports. 49 Fed. Reg. 6684 (Feb. 22, 1984); *see also La. Ass’n of Indep. Producers*, 958 F.2d at 1120. Reflecting the terms of the Natural Gas Act, the guidelines presume that open markets will further the public interest. *See* 49 Fed. Reg. at 6685; *see also New England Fuel Inst. v. Econ. Regulatory Admin.*, 875 F.2d 883, 883-84 (D.C. Cir. 1989). DOE has adopted a substantially similar approach for natural-gas exports. AR 79 at 9-10, JA \_\_-\_\_. When considering applications for export authorization, DOE focuses on: (1) the domestic need for the natural gas proposed for export; (2) the security of domestic natural-gas supplies; (3) whether the export

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<sup>4</sup> Such nations include: Australia, Bahrain, Canada, Chile, Columbia, the Dominican Republic, El Salvador, Guatemala, Honduras, Jordan, Mexico, Morocco, Nicaragua, Oman, Panama, Peru, the Republic of Korea, and Singapore. *See* <http://energy.gov/fe/services/natural-gas-regulation/how-obtain-authorization-import-andor-export-natural-gas-and-Ing>.

arrangement is consistent with promoting market competition; and (4) any other factors, including environmental impacts, bearing on the public interest. *Id.*

## 2. *FLEX's Export Applications*

In the early 2000s, Freeport LNG Development (a corporate parent of FLEX) obtained DOE and FERC authorizations to construct an LNG-import terminal and related facilities on Quintana Island, Texas. AR 1 at 3-5; *see also* 77 Fed. Reg. 7569 (Feb. 13, 2012). Not long thereafter, the domestic natural gas market fundamentally changed. New production methods – including hydraulic fracturing of shale – created a domestic natural gas surplus. *See* 77 Fed. Reg. at 7570. Amidst this transformation, FLEX developed plans to add a liquefaction plant and related facilities at the Freeport Terminal to export U.S. LNG (collectively, the “Freeport Liquefaction Project”). *Id.* at 7549. As part of these plans, FLEX submitted four separate applications to DOE for LNG export authorizations. *See* AR 44 at 11-12, JA \_\_-\_\_.

FLEX submitted its first two applications in December 2010: one for FTA nations and the other for non-FTA nations. *Id.* In each, FLEX sought long-term multiple-contract authorization to export LNG in an amount equivalent to 1.4 Bcf/d of natural gas, or 511 billion cubic feet per year (“Bcf/yr”). *Id.* In December 2011, FLEX submitted a second pair of substantially similar applications, for authorization

to export the equivalent of an additional 1.4 Bcf/d of natural gas, for a total of 2.8 Bcf/d. *Id.*

In accordance with the Natural Gas Act, 15 U.S.C. § 717b(c), DOE promptly granted FLEX's FTA applications. AR 44 at 1, n.3 & 12, JA \_\_, \_\_; *see also* AR 44 at 165 (¶ C) (referencing DOE/FE Order Nos. 2913 & 3066), JA \_\_. For FLEX's non-FTA applications, DOE published notices of intent to initiate public-interest review proceedings. *See* 77 Fed. Reg. 7568 (Feb. 13, 2012) (2011 application); 76 Fed. Reg. 4885 (Jan. 27, 2011) (2010 application).

Sierra Club did not participate in the proceedings on FLEX's original 2010 application ("*FLEX I*"). Rather, Sierra Club filed a protest and moved to intervene only in the proceedings on FLEX's 2011 application ("*FLEX II*"). *See* AR 44 at 2, JA \_\_. In its protest and motion, Sierra Club challenged FLEX's forecast of economic benefits and argued that the proposed project would have overriding adverse environmental effects on the Gulf Coast region and global climate change. *See* AR 44 at 73-88, JA\_\_- \_\_.

### 3. *Export Studies*

Around the time that DOE received FLEX's applications, DOE received similar applications from other companies seeking to export LNG. *See* 77 Fed. Reg. 73,627 (Dec. 11, 2012). To effectively respond to all pending and expected applications, DOE commissioned two studies to evaluate the impact of LNG exports

on domestic energy markets and related macroeconomic effects. *Id.* DOE published the key findings of both studies and made both studies available for public review and comment. *Id.*

*a. 2012 EIA Study*

DOE first asked the Energy Information Administration (“EIA”) to estimate the effects of LNG exports on domestic energy markets over a 25-year period utilizing the National Energy Modeling System (“NEMS”). *See* AR 44 at 32-40, JA \_\_\_-\_\_\_. EIA is an independent agency within DOE tasked with collecting and evaluating data on the adequacy of the nation’s resources for meeting short and long-term energy needs. *See* 42 U.S.C. § 7135(a)(2). EIA uses the NEMS model, *inter alia*, to prepare long-term projections, or “Annual Energy Outlooks,” of market conditions for natural gas and other energy resources.<sup>5</sup> *See* AR 25 at 1, JA \_\_\_.

For its study in the present case, EIA started with market scenarios examined in the 2011 Annual Energy Outlook, and then added LNG export demand equivalent to 6 Bcf/d or 12 Bcf/d, phased in at both slow and rapid rates. AR 25 at 1, JA \_\_\_. These demand assumptions represented, respectively, approximately 9 or 18 percent of then-current domestic natural-gas production. AR 25 at 2, JA \_\_\_. These values were “exogenously specified,” not projected by the model. AR 25 at 2, JA \_\_\_. NEMS is “not a world energy model” and does not “account for all interactions

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<sup>5</sup> Current and prior outlooks are available at: <http://www.eia.gov/forecasts/aeo/>.

between energy prices and supply/demand” in globally-competitive industries. *Id.* at 3, JA \_\_\_\_\_. For its 2012 Study, EIA did not project whether export volumes would actually reach 12 Bcf/d, if DOE were to authorize exports up to or beyond such amount. *Id.* at 2, JA \_\_\_\_\_. EIA also observed that energy markets are highly dynamic and subject to “many events that cannot be foreseen, such as supply disruptions, policy changes, and technological breakthroughs.” *Id.* For these and other reasons, EIA cautioned that the results of its 2012 report were “highly uncertain.” *Id.*

Subject to these disclaimers, EIA projected, *inter alia*: (1) that the assumed increases in natural-gas demand would spur greater natural-gas production sufficient to satisfy 60 to 70 percent of the export volume; (2) that approximately 72 percent of the increased production would come from shale; (3) that the remaining export volume would come from natural gas that otherwise would be consumed domestically; and (4) that higher domestic prices would cause reduced natural-gas consumption in the domestic electric-power sector on the order of 0.5 to 1.5 percent, which would be compensated for primarily by an increase in coal consumption and secondarily by increases in renewable energy generation and conservation. AR 25 at 6, 12, 18, JA \_\_\_, \_\_\_, \_\_\_.

*b. NERA Study*

Because EIA’s study did not project full macroeconomic impacts on the U.S. economy, DOE commissioned a private consultant (NERA) to conduct such a study.

*See* AR 44 at 31, 40-41, JA \_\_, \_\_-\_\_; *see also* AR 26, JA \_\_-\_\_ (study). NERA analyzed impacts across a range of macroeconomic indicators, including gross domestic product, price, wages, household incomes, and welfare. AR 44 at 41, JA \_\_. To gauge such impacts, NERA modeled the scenarios addressed in the 2012 EIA study, as well as additional scenarios based on different assumptions about natural-gas development and international economic conditions, including a scenario with no U.S. export controls. *See* AR 44 at 43-45, JA \_\_-\_\_; AR 26 at 3-5, JA \_\_-\_\_. Unlike the 2012 EIA study, NERA’s modeling considered global supply and demand and international market responses. *See* AR 44 at 45-49, JA \_\_, \_\_; AR 26 at 3-5, JA \_\_-\_\_.

NERA produced two sets of findings. First, unlike EIA, NERA addressed the conditions in which export levels prescribed in the EIA study would be “achievable.” *See* AR 44 at 49, JA \_\_; AR 26 at 3, 6, 9-10, JA \_\_, \_\_, \_\_-\_\_. NERA determined that “in many cases” – including the EIA reference case – “the world natural-gas market would not accept the full amount of exports assumed in the EIA scenarios at export prices high enough to cover the U.S. wellhead domestic prices calculated by the EIA.” AR 26 at 3, JA \_\_. Stated differently, considering global supply and demand, NERA “estimated lower export volumes” than the 6



Bcf/d and 12 Bcf/d scenarios “specified . . . for the EIA study,” indicating lesser impacts on U.S. markets.<sup>6</sup> AR 26 at 10, JA \_\_\_\_.

Second, NERA projected net economic benefits to the United States in all scenarios studied. AR 26 at 6-7, JA \_\_\_\_-\_\_\_\_; AR 44 at 41-42, 51-52, JA \_\_\_\_-\_\_\_\_. NERA projected that exports would cause natural gas prices to rise in a “relatively narrow range,” *id.*, adversely affecting some sectors and lowering real wages. *Id.* at 51-54, JA \_\_\_\_-\_\_\_\_. But NERA found that “serious competitive impacts” likely would be confined to “narrow segments” of U.S. industry, *id.* at 55-56, JA \_\_\_\_-\_\_\_\_, and would be offset, in all scenarios, by increases in household income and welfare. *Id.* at 51-52, JA \_\_\_\_-\_\_\_\_. NERA projected that such net economic benefits would occur even with unlimited exports (*i.e.*, where export volumes are determined solely by market forces). *Id.* at 56-57, JA \_\_\_\_-\_\_\_\_.

#### 4. *Conditional Authorization*

In 2013, DOE issued orders with findings on all non-environmental issues considered under Section 3(a), and conditionally approved both of FLEX’s non-FTA export applications. *See* AR 44, JA \_\_\_\_-\_\_\_\_. In its conditional order in *FLEX II* (at issue here), DOE granted Sierra Club’s motion to intervene, finding that the proposed LNG exports could affect the economic and environmental interests of

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<sup>6</sup> NERA identified only three scenarios where export volume (without controls) would balance at levels greater than 12 Bcf/d. *See* AR 44 at 51 & n. 76. All three involved international demand or supply shock. *Id.*

Sierra Club's members. AR 44 at 147, JA \_\_\_. But contrary to Sierra Club's arguments, DOE found that the NERA report was "fundamentally sound" and supported a finding that the proposed authorization would "not be inconsistent with the public interest." *Id.* at 148-53, JA \_\_\_-\_\_\_. As for Sierra Club's environmental concerns, DOE stressed that its 2013 order was conditioned on FLEX's satisfactory completion of the ongoing FERC-led environmental review of the proposed Freeport Liquefaction Project. *Id.* at 152, 163-164, JA \_\_\_, \_\_\_-\_\_\_. DOE explained that it was a cooperating agency on the NEPA review and would independently evaluate environmental impacts and concerns before issuing any final order on non-FTA LNG exports. *Id.*

DOE also limited the conditional export authorization in *FLEX II* to an amount equivalent of 0.4 Bcf/d of natural gas. *Id.* at 11-13, 162, JA \_\_\_-\_\_\_, \_\_\_. As noted *supra*, in both *FLEX I* and *FLEX II*, FLEX sought LNG export authority in an amount equivalent to 1.4 Bcf/d of natural gas, for a combined total of 2.8 Bcf/d. *Id.* FLEX subsequently proposed, however, to construct a liquefaction plant with a maximum capacity of 1.8 Bcf/d. *Id.* So that the combined orders in *FLEX I* and *FLEX II* would match FLEX's liquefaction capacity, DOE limited export authorization in *FLEX II* to 0.4 Bcf/d. *Id.* DOE also explained that the volumes in the non-FTA export authorizations were not "additive" to the export volumes authorized in the FTA orders. *Id.* at 163, JA \_\_\_.

## C. Environmental Review and Associated Proceedings

### 1. NEPA

Under NEPA, whenever a federal agency proposes to take a “major Federal action[] significantly affecting the quality of the human environment,” the agency must prepare, for public review, a detailed environmental impact statement (“EIS”) describing, *inter alia*, the likely environmental effects of the proposal, “any adverse environmental effects which cannot be avoided should the proposal be implemented,” and potential alternatives. 42 U.S.C. § 4332(2)(C). NEPA does not “dictate \* \* \* decisional outcomes” but instead mandates a decisional process.

*Sierra Club v. U.S. Army Corps of Eng’rs*, 803 F.3d 31, 36-37 (D.C. Cir. 2015).

NEPA’s “twin purposes” are to ensure that agency decisions are informed by “careful consideration of environmental impact[s]” and by public participation in the evaluation of environmental impacts and policy tradeoffs. *Id.*

The Council on Environmental Quality (“CEQ”) has issued regulations on the form, content, and preparation of environmental impact statements, *see* 40 C.F.R. § 1500 *et seq.*, which bind federal agencies by executive order and are owed “substantial deference” by the courts. *TOMAC, Taxpayers of Mich. Against Casinos v. Norton*, 433 F.3d 852, 861 (D.C. Cir. 2006) (citing *Andrus v. Sierra Club*, 442 U.S. 347, 358 (1979)). Under the CEQ regulations, an agency must consider direct, indirect, and cumulative effects. *See* 40 C.F.R. § 1508.25(c); *see also TOMAC*, 433

F.3d at 864. “Indirect effects” include “growth inducing effects” and other “induced changes” and their “related effects on air and water and other natural systems” that are “caused by” an agency action but removed in time or distance, as long as such effects are “still reasonably foreseeable.” 40 C.F.R. § 1508.8(b). “Cumulative” effects are impacts resulting “from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.” *Id.* § 1508.7.

When multiple federal agencies have jurisdiction over different aspects of a proposal, a designated “lead agency” must supervise the preparation of a common EIS,<sup>7</sup> with the other agencies acting as “cooperating agencies.” *See Id.* §§ 1501.5, 1501.6, 1508.5, 1508.16.

## 2. *Environmental Impact Statement*

In a 2005 amendment, Congress designated FERC the lead agency on NEPA reviews relating to authorizations under Section 3 of the Natural Gas Act. *See* Pub. L. 109-58, § 313(b), 119 Stat. 668 (Aug. 8, 2005) (codified at 15 U.S.C. § 717n(b)(1)). Consistent with this directive and its authority over the construction and operation of export terminals, 15 U.S.C. § 717b(e), FERC acted as lead agency in preparing an EIS for the Freeport Liquefaction Project. Given its jurisdiction over FLEX’s proposed LNG exports, DOE acted as a cooperating agency. AR 56 at

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<sup>7</sup> An EIS is not required for actions covered by a “categorical exclusion,” or when on the basis of an environmental assessment, an agency makes a “finding of no significant impact.” 40 C.F.R. § 1501.4.

1-2, 1-8, JA \_\_, \_\_. The Environmental Protection Agency (“EPA”), the Army Corps of Engineers, the Department of Transportation, and the National Oceanic and Atmospheric Administration also acted as cooperating agencies, based on their regulatory authorities over other aspects of the Project. *Id.* at 1-8 to 1-10, JA \_\_-\_\_. FERC initiated NEPA proceedings in August 2011, released a draft EIS in March 2014, and a final EIS in June 2014. *Id.* at 1-11 to 1-14, JA \_\_-\_\_.

The EIS disclosed and analyzed direct, indirect, and cumulative impacts from the construction and operation of the proposed liquefaction and export facilities on the waterbodies, wetlands, wildlife, and air quality within the project area and surrounding region, and specific noise and socioeconomic impacts on the town of Quintana and communities within Brazoria County. *Id.* at ES-5 to ES-10. For example, to determine air-quality impacts, the EIS modeled the likely pollutant emissions from the proposed export facilities and vessels likely to visit the terminal, *id.* at 4-211, 4-217 to 4-224, identified other regional sources of air pollutants, and assessed the cumulative impact on air quality within the Metropolitan Houston-Galveston Intrastate Air Quality Control Region, the relevant area for determining compliance with national ambient air quality standards under the Clean Air Act. *Id.* at 4-206, 4-257 to 4-258, JA \_\_, \_\_-\_\_. The EIS also estimated the potential greenhouse-gas emissions from construction and operation of the liquefaction project. *See id.* at 4-206 to 4-224, 4-259 to 4-261 JA \_\_-\_\_ . The EIS concluded

that, while the project would have significant impacts on the town of Quintana, principally from dust, noise, and traffic during construction, the project would not have “significant and readily identifiable” impacts on natural resources. *Id.* at 4-266, 5-17, JA \_\_, \_\_.

FERC declined to evaluate, however, the potential nationwide impacts from shale-gas development that might be induced by LNG exports cumulatively, or potential climate-change impacts from the “end use[]” of exported LNG. *Id.* at 4-240 to 4-241, JA \_\_-\_\_. Because the Freeport Liquefaction Project does not depend on production from any particular shale-gas play<sup>8</sup> and because the extent and destination of FLEX exports is undetermined, FERC determined that environmental impacts from natural-gas production and LNG consumption are not reasonably foreseeable. *Id.* FERC approved construction and operation of the Freeport Liquefaction Project in July 2014.<sup>9</sup> AR 61, JA \_\_-\_\_.

### 3. *Environmental Addendum*

In conjunction with FERC’s preparation of the EIS for the Freeport Liquefaction Project, DOE conducted its own broader environmental review with respect to the various LNG export applications then pending before DOE. In

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<sup>8</sup> “Plays” are subsurface geological formations containing natural gas. AR 87 at 18.

<sup>9</sup> FERC denied Sierra Club’s petition for rehearing. Sierra Club filed a petition for review, which remains pending before this Court (D.C. Cir. No. 14-1275).

response to comments from Sierra Club and others, DOE prepared an “Addendum to Environmental Review Documents” (“Environmental Addendum” or “Addendum”) to consider potential environmental impacts from “induced” shale-gas production and production from other unconventional sources. AR 67 at 1, JA \_\_\_\_.

DOE focused on these sources because EIA’s market projections showed them to be the source of nearly all future growth in natural-gas production. *See id.* at 5, JA \_\_\_\_.

DOE released a draft Addendum in May 2014. AR 67 at 3, JA \_\_\_\_; *see also* 79 Fed. Reg. 32,258 (June 4, 2014) (public notice). DOE released a final Addendum and response to comments in August 2014. *See* AR 67 at App. B, JA \_\_\_\_-\_\_\_\_; *see also* 79 Fed. Reg. 48,132 (Aug. 15, 2014).

In the Addendum, DOE observed that the “current rapid development” of unconventional natural-gas sources – shale gas, coalbed methane, and “tight gas” from sandstone and other rock – likely would continue with or without LNG exports. *Id.* at 2, JA \_\_\_\_.

To show the magnitude of increased development, DOE disclosed EIA’s (2014) projections of natural-gas production levels through 2040. *Id.* at 5, JA \_\_\_\_.

These projections accounted for LNG exports. *Id.* at 43, JA \_\_\_\_.

DOE observed, however, that there are “fundamental uncertainties” about the size of the market for LNG exports and about “where, when, or by what method” additional domestic natural gas would be produced to serve the export market that develops. *Id.* at 1-2, JA \_\_\_\_-\_\_\_\_.

For these reasons, DOE determined that it could not

“meaningfully” predict “specific environmental impacts” from export-induced production, within the localities or regions where such impacts would occur. *Id.*

Nonetheless, acknowledging that exports could “accelerate \* \* \* the development of unconventional [natural-gas] resources,” DOE determined that it was important for purposes of the Department’s Section 3(a) public-interest review to disclose and consider associated environmental effects. *Id.* at 1-5, JA \_\_\_-\_\_\_. To this end, DOE identified known shale plays, tight-gas plays, and coalbed-methane fields in the lower-48 states, *see id.* at 6-9, JA \_\_\_-\_\_\_, and reviewed existing literature on the environmental impacts associated with producing natural gas from such sources, including potential adverse impacts on water quantity, water quality, air quality, and seismicity. *Id.* at 10-32, 45-68, JA \_\_\_-\_\_\_, \_\_\_-\_\_\_; *see also* AR 79 at 45-46, JA \_\_\_-\_\_\_.

The Addendum also addressed the “upstream” greenhouse-gas emissions that result from natural-gas production. AR 67 at 33-44, JA \_\_\_-\_\_\_. Natural gas is mostly methane (CH<sub>4</sub>), a greenhouse gas that has an atmospheric heat-retention effect substantially greater than carbon dioxide (CO<sub>2</sub>) (the principal greenhouse gas). *Id.* at 36, JA \_\_\_. Methane’s heat-trapping effect is 100 times greater than CO<sub>2</sub> upon release, but dissipates to near zero after 100 years. *Id.*, JA \_\_\_. Methane’s “global warming potential” is thus higher when averaged over a 20-year timeframe than over a 100-year timeframe. *Id.* In addition to “downstream” emissions from



the combustion of natural gas as fuel, the various stages of natural-gas production (extraction, transportation, processing, and storage) create “upstream” emissions of methane and CO<sub>2</sub>, due to the incidental venting, leaking, and flaring of natural gas, and the combustion of natural gas to power equipment. *Id.* at 36-39, JA \_\_\_\_.

In 2014, EPA estimated that methane emissions from natural-gas production accounted for approximately 1.6 percent of all U.S. greenhouse-gas emissions in 2012, while methane and CO<sub>2</sub> emissions from natural-gas production together accounted for approximately 2.9 percent of all U.S. greenhouse-gas emissions. *Id.* at 33, 40, JA \_\_\_, \_\_\_. DOE disclosed this data and projected, based on an existing study, that future upstream greenhouse-gas emissions from natural-gas production would rise to 3.8 percent of U.S. greenhouse-gas emissions (for the period from 2015 to 2035) without regard to exports. *Id.* at 42-43, JA \_\_\_\_-\_\_\_\_.

DOE concluded that “[i]ncreased unconventional natural-gas production” – including any incremental increases from exports – “will increase [greenhouse-gas] emissions from upstream [natural-gas] activities” and that such emissions “may contribute to climate change.” *Id.* at JA \_\_\_\_\_. DOE further observed, however, that the “net” effect of LNG exports on *global* greenhouse-gas emissions depends on the fuels displaced by exported LNG at the point of consumption (power generation) and that the net impact on climate change could be positive. *Id.*

#### 4. *Life Cycle Analysis of Greenhouse-Gas emissions*

To address potential impacts on global greenhouse-gas emissions, DOE commissioned the National Energy Technology Laboratory (“NETL”), a DOE research laboratory, to prepare a “Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States.” AR 54, JA \_\_-\_\_. NETL published its report (“Life Cycle Analysis”) in May 2014, and DOE made the report available for review and comment by the public and the parties to the proceedings on FLEX’s export applications. AR 52, JA \_\_; AR 53, JA \_\_ (79 Fed. Reg. 32,260 (June 4, 2014)).

In the Life Cycle Analysis, NETL identified two representative markets for U.S. exported LNG – Rotterdam, Netherlands, and Osaka, Japan – and then compared the total greenhouse gases that would be emitted to generate one megawatt hour (“MWh”) of electricity in each market, using: (1) LNG imported from the United States; (2) LNG imported from closer regional sources; (3) natural gas exported *via* pipeline from Russia; and (4) regional coal. AR 54 at 1-2, JA \_\_-\_\_. In each scenario, NETL considered CO<sub>2</sub> and methane emissions from all stages of fuel production, from extraction to final combustion. *Id.*

NETL found that upstream greenhouse-gas emissions from producing and delivering LNG to European and Asian markets will exceed upstream emissions from producing and delivering coal in all scenarios, given the significant methane

emissions in natural-gas production. *Id.* Nonetheless, because the majority of greenhouse-gas emissions from fossil fuels used in electric generation are downstream emissions from combustion at the power plant, and because natural gas is much cleaner-burning than coal, NETL found that overall greenhouse-gas emissions associated with the LNG-export scenarios would be significantly lower than overall emissions from the regional-coal scenarios. *Id.*

As for the natural-gas scenarios, NETL found that overall greenhouse-gas emissions from U.S. LNG would be: (a) slightly higher than overall emissions from regional LNG; (b) significantly lower than emissions from Russian gas in terms of their 20-year global warming potential; and (c) comparable to emissions from Russian gas in terms of their 100-year global warming potential. *Id.* at 10, 18. These differences are attributable principally to different emission profiles during transportation. *Id.*

NETL concluded that exporting U.S. LNG to produce power in Europe and Asia will *not* increase greenhouse-gas emissions compared to regional coal power, and that potential differences in greenhouse-gas emissions relating to the use of U.S. LNG, regional LNG, or Russian gas are largely limited to “transport distance” and are otherwise “indeterminate” due to uncertainty in the modeling data. AR 54 at 18, JA \_\_; *see also* AR 79 at 63-66, JA \_\_-\_\_ .

### 5. *Updated EIA Study and LNG Export Projections*

After preparing the 2012 study (*supra*) on how LNG exports in amounts equivalent to 6 and 12 Bcf/d might impact domestic energy markets, EIA began to include LNG-export projections in its annual energy market forecasts. In the 2014 Annual Energy Outlook, EIA projected, as part of its “reference case,”<sup>10</sup> that U.S. LNG exports will gradually rise to 3500 Bcf/yr (approximately 9.6 Bcf/d) by 2029, and remain around that level through 2040, the end of the projection period. AR 50-g at MT-24, JA \_\_\_\_.<sup>11</sup> This compares to 3100 Bcf/yr (approximately 8.5 Bcf/d) in projected pipeline exports of natural gas to Mexico by 2040. *Id.* DOE referenced both estimates in the Environmental Addendum to provide context for its discussion of potential environmental impacts. *See* AR 67 at 43, JA \_\_\_\_.

DOE also asked EIA to prepare a second study of the effects of LNG exports on U.S. markets, this time to evaluate impacts from aggregate exports in amounts above 12 Bcf/d, as compared to LNG exports projected in the 2014 Annual Energy Outlook. AR 72-a at 5, JA \_\_\_\_\_. EIA’s 2014 study modeled LNG export scenarios of 12 Bcf/d to 20 Bcf/d, phased in at an “almost impossible” rate, to “show [the] outer envelope of domestic production and consumption responses.” AR 72-a at 5, JA \_\_\_\_.

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<sup>10</sup> EIA’s projections include five scenarios with different assumptions regarding the amount of natural-gas reserves and oil prices. *See* AR 72-a at 5, JA \_\_\_\_\_. The “reference” case falls in the middle of both ranges. *Id.*

<sup>11</sup> Approximately 800 Bcf/d is projected to come from Alaska. *Id.*

Similar to the 2012 study, the 2014 study projects that increased natural-gas production would satisfy about 61 to 84 percent of the enhanced LNG exports, with shale-production supplying approximately 75 percent or more of the overall increase. *Id.* at 12, 15-17, JA \_\_\_. Ten to 18 percent of the added export volume would come from decreased domestic natural-gas consumption in the electric-power sector, to be replaced by “[a] combination of \* \* \* demand reduction and increased coal, nuclear, and renewable [power] generation.” *Id.* at 18, JA \_\_\_.

#### **D. DOE Orders**

##### *1. Final Order (DOE/FE Order 3357-B)*

On November 14, 2014, DOE issued a final order in *FLEX II*, formally adopting the EIS, AR 79 at 83, JA \_\_\_, summarizing the Environmental Addendum and Life Cycle Analysis, *id.* at 46-82, JA \_\_\_-\_\_\_, and responding to environmental objections by Sierra Club and others. *Id.* at 82-93, JA \_\_\_-\_\_\_.

DOE determined that the EIS “covers all reasonably foreseeable environmental impacts” of the Freeport Liquefaction Project for NEPA-review purposes, and that DOE could not “foresee and analyze with any particularity” the environmental impacts associated with “induced” natural-gas production, given “fundamental uncertainties” about the extent of induced production and where such production might occur. *Id.* at 84-85. JA \_\_\_. DOE explained that the Addendum provides a detailed look at the types of environmental effects that might occur from

additional production, and shows that such effects (other than potential climate-change impacts) are principally “local in nature,” involving “local water resources, air quality and land use patterns.” *Id.* at 85, JA \_\_\_\_.

As for greenhouse-gas emissions, DOE referenced projections in the 2012 EIA study showing that LNG exports at levels equivalent to 6 Bcf/d and 12 Bcf/d would lead to various incremental increases in domestic energy-related CO<sub>2</sub> emissions due to the combustion of natural gas for LNG liquefaction and a shift to coal in the electric-power sector.<sup>12</sup> *Id.* at 89, JA \_\_\_\_\_. DOE noted, however, that EIA’s study did not account for newly promulgated and proposed regulations that would mitigate CO<sub>2</sub> emissions from coal-fired power plants. *Id.* at 89-90, JA \_\_\_\_-\_\_\_\_; *see also* AR 25 at 12, n.7, JA \_\_\_\_\_. DOE also observed that upstream greenhouse-gas emissions from LNG production were accounted for in NETL’s Life Cycle Analysis. AR 79 at 89, JA \_\_\_\_.

DOE acknowledged that the Life Cycle Analysis did not include other energy sources such as nuclear energy and renewables, and did not answer the “ultimate” question as to whether LNG exports would increase or decrease global greenhouse-gas emissions. *Id.* at 92, JA \_\_\_\_\_. Such an analysis, DOE noted, would require

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<sup>12</sup> EIA projected that U.S. energy-related CO<sub>2</sub> emissions from 2015 to 2035 would increase from around 0.1 to 1.3 percent. AR 25 at 19, JA \_\_\_\_\_. EIA’s 2014 report projected that increasing LNG exports from approximately 9.6 Bcf/d (reference-case) to between 12 and 20 Bcf/d would increase U.S. energy-related CO<sub>2</sub> emissions between 2015 and 2040 by around 0.2 to 0.6 percent. AR 72-a at 21, JA \_\_\_\_.

consideration of the dynamics of all energy markets in LNG-importing nations. *Id.* at 93, JA \_\_\_. Given the many uncertainties in modeling such market dynamics, the analysis would be “too speculative to inform the public interest determination.” *Id.* DOE determined that the Life Cycle Analysis was “useful,” given the prevalence of coal and natural gas as electric-power sources in likely export markets, *id.*, and provided evidence that LNG exports might *decrease* global greenhouse-gas emissions (*e.g.*, by displacing coal). *Id.* at 93-94, JA \_\_-\_\_. DOE found no evidence that LNG exports would increase global greenhouse-gas emissions “in a material or predictable way.” *Id.* at 94, JA \_\_\_.

DOE concluded that the “public interest is better served” by “directly” regulating greenhouse-gas emissions and other environmental effects of natural-gas production through federal, state, and local controls, rather than through the “blunt \* \* \* instrument” of export controls. *Id.* at 86-87, JA \_\_-\_\_. DOE also reaffirmed its earlier findings that LNG exports would provide net benefits for the U.S. economy, would increase energy security for key U.S. allies, and would have other benefits relating to open markets and international trade. *Id.* at 94-97, JA \_\_-\_\_.

On balance, DOE found insufficient evidence to rebut the presumption that FLEX’s proposed LNG exports are in the public interest. *Id.* at 87, 97-98, JA \_\_, \_\_-\_\_. Like its conditional LNG export authorization in *FLEX II* (pp. 12, *supra*), DOE’s final authorization in *FLEX II* is limited to 0.4 Bcf/yr. *Id.* at 105-106, JA \_\_-

\_\_. DOE concurrently issued a final order in *FLEX I* – not challenged by Sierra Club – granting non-FTA export authorization in the amount of 1.4 Bcf/yr, for a total of 1.8 Bcf/yr. *Id.* at 2, JA \_\_ (referencing DOE/FE No. 3282-C). Both orders provide 20-year non-FTA export authorization beginning on the date of the first export, or seven years from the date of the orders, whichever is earlier. *See id.* at 107, JA \_\_. As recommended in the EIS, AR 56 at 5-18 to 5-33, JA \_\_-\_\_, both DOE orders (like FERC’s order) require compliance with 83 environmental mitigation measures. *See* AR 79 at 108, JA \_\_; AR 61 at 26-43, JA \_\_-\_\_.

## 2. *Rehearing Denial (DOE/FE Order 3357-C)*

Sierra Club sought rehearing in *FLEX II*, arguing that DOE failed to adequately consider indirect and cumulative environmental effects relating to induced natural-gas production, increased coal consumption, and the consumption of exported LNG. DOE denied rehearing on December 4, 2015. AR 87, JA \_\_-\_\_.

In its rehearing-denial order, DOE acknowledged the “economic logic” behind predictions that LNG exports would increase domestic natural-gas production “at the margin.” AR 87 at 15-16, JA \_\_-\_\_. But DOE reiterated its determination that it would be “impossible to identify with any confidence the marginal production at the wellhead or local level,” which would be needed to ascertain specific environmental impacts. *Id.* at 16, JA \_\_. DOE explained that the “key parameter” for modeling impacts is the “price elasticity of natural-gas



production,” *i.e.*, the extent to which marginal price increases will lead natural-gas suppliers to develop new sources. *Id.* at 17, JA \_\_\_. Given variation in local geology, regulation, land use, and infrastructure, “estimating price elasticity of natural gas supply at the local level is much more speculative than doing so at the national level where local idiosyncrasies are averaged out.” *Id.* at 18, JA \_\_\_.

While modeling macroeconomic impacts on the intermediate level of shale plays might be “more reliable” than local or regional modeling, DOE determined that play-level modeling (like nationwide modeling) would remain insufficiently specific for meaningful analysis of environmental impacts on specific natural resources. *Id.* Moreover, because shale plays are distributed across the lower-48 states, AR 67 at 6, JA \_\_\_, and because there is a vast integrated pipeline network connecting natural-gas suppliers, processors, and consumers across the lower-48 states, AR 79 at 24, JA \_\_\_, higher natural-gas prices (attributable to export demand) could accelerate production in any producing region. AR 87 at 19, JA \_\_\_. To comprehensively model play-level impacts would impose a heavy burden on DOE without meaningful return. *Id.* As DOE explained, any projections of environmental impacts derived from such a study would be too “probabilistic and attenuated” to provide meaningful guidance for purposes of DOE’s public-interest review of FLEX’s proposed exports. *Id.*

As for potential impacts relating to coal consumption, DOE explained that the causal relationship between LNG export authorization and domestic coal consumption is “even more attenuated” than the relationship with natural-gas production. *Id.* at 22-23, JA \_\_\_-\_\_\_. *Id.* And DOE again noted that EIA’s projections with respect to coal are outdated. *Id.* Most significantly, in addition to previously cited regulatory changes,<sup>13</sup> in 2015, EPA promulgated the first-ever regulations (“Clean Power Plan”) for directly regulating CO<sub>2</sub> emissions from new and existing coal-fired power plants and similar “electric utility generating units.” *See* 80 Fed. Reg. 64,662 (Oct. 23, 2015); 80 Fed. Reg. 64,510 (Oct. 23, 2015).<sup>14</sup>

Finally, DOE considered and rejected objections to using the Life Cycle Analysis for evaluating climate-change impacts. *Id.* at 24-36, JA \_\_\_-\_\_\_. In response to Sierra Club’s technical objections, DOE determined: (1) that NETL used an appropriate “methane leakage rate” to model emissions from natural-gas production and transportation, and (2) that NETL’s failure to account for “climate carbon feedbacks” when specifying values for the global warming potential of methane did not materially alter the study’s conclusions. *Id.* at 24-31, JA \_\_\_-\_\_\_.

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<sup>13</sup> *See* AR 79 at 89, JA \_\_\_ (citing 77 Fed. Reg. 9,304 (Feb. 16, 2012) (Mercury and Air Toxics Standard) and 76 Fed. Reg. 48,208 (Aug. 8, 2011) (Transport Rule)).

<sup>14</sup> The Supreme Court stayed implementation of the Clean Power Plan, pending the disposition of petitions for review currently before this Court. *See Chamber of Commerce v. EPA*, 136 S.Ct. 999 (2016) (mem.), 2016 WL 502658.

Sierra Club also raised two methodological objections: (1) that DOE should have disregarded foreign emissions when evaluating the climate-change impacts of LNG exports, given the United States' international commitments to limit domestic emissions, and (2) that DOE should have compared the lifecycle emissions of U.S. LNG exports to renewable energy sources, on the assumption that LNG will compete principally against "new capacity" that "will be more than 50 percent renewables." *Id.* at 31-32, JA \_\_-\_\_.

DOE responded that it had sufficiently addressed greenhouse-gas emissions, *via*: (1) the EIS, which evaluated greenhouse-gas emissions from the construction and operation of the FLEX liquefaction plant and associated terminal facilities; (2) the Addendum, which included a detailed discussion of greenhouse-gas emissions associated with producing and transporting natural gas; and (3) the Life Cycle Analysis, which quantified upstream domestic emissions (as well as downstream foreign emissions) from U.S. LNG exports, per MWh of electricity generated. *Id.* at 33, JA \_\_. DOE also reiterated that comparisons in the Life Cycle Analysis were "well chosen" to provide useful information, because U.S. LNG exports would most naturally compete with other LNG exports and Russian pipeline gas (as "gas-on-gas" competition), and given the prevalence of coal in export markets "as a source of baseload power." *Id.* at 34, JA \_\_.

## **SUMMARY OF ARGUMENT**

### **A. NEPA**

Under CEQ regulations and NEPA’s “rule of reason,” an agency’s environmental-review obligations are commensurate with the agency’s ability to reasonably foresee and meaningfully evaluate environmental impacts in the context of the proposed action. DOE reasonably determined that it could not meaningfully forecast specific indirect effects from natural-gas production induced by LNG exports or from foreign consumption of U.S.-exported LNG. To inform its Section 3(a) public-interest review, however, DOE went further and prepared an Environmental Addendum that detailed the nature of environmental impacts associated with accelerated natural-gas production, and a Life Cycle Analysis that examined the potential effects of LNG exports on global greenhouse-gas emissions. Because DOE completed this additional environmental review with notice and comment proceedings, this Court can and should consider DOE’s environmental-review record as a whole. Together, the EIS, Environmental Addendum, and Life Cycle Report constitute a “hard look” at relevant environmental issues.

#### *1. Export-Induced Gas Production*

DOE acknowledged that export authorizations might accelerate growth in domestic natural-gas production and incrementally add to associated environmental impacts. In the Environmental Addendum, DOE detailed the nature of such impacts

and disclosed that certain effects could be significant. DOE reasonably declined to speculate about specific impacts because such impacts cannot be reasonably foreseen. As DOE explained, LNG export levels depend on long-term conditions in foreign and domestic markets that are highly uncertain, and export demand could induce production in any natural-gas-producing area across the lower 48-states. Absent the ability to reasonably predict the magnitude and location of induced natural-gas production, DOE reasonably concluded that it cannot meaningfully predict associated impacts to specific water bodies, air-quality control regions, and land-use planning areas. Conversely, setting aside the unique issues associated with climate change, predicting gross pollutant emissions at a national level or across an entire shale-play – emissions that cannot reasonably be associated with particular impacts on natural resources – would provide little (if any) information of value to DOE's decisionmaking.

## 2. *Export-Induced Coal Consumption*

The relationship between LNG exports and domestic coal consumption is even more attenuated than the relationship between LNG exports and natural-gas production. Because long-term impacts on coal consumption are highly uncertain, and because DOE cannot meaningfully forecast the extent and location of any export-induced coal consumption, DOE reasonably declined to speculate about associated impacts, *e.g.*, on regional air quality. As for greenhouse-gas emissions,

EIA modeled CO<sub>2</sub> emissions, including emissions from coal, as part of the 2012 and 2014 LNG export studies. Although this modeling did not account for methane emissions, coal consumption is not a significant source of methane and Sierra Club does not contend that the EIA models were deficient in capturing CO<sub>2</sub> emissions from coal consumption that might be induced by LNG exports.

### 3. *Greenhouse-Gas Emissions*

DOE evaluated the upstream and downstream greenhouse-gas emissions (CO<sub>2</sub> and methane) from producing, transporting, and exporting LNG in its Life Cycle Analysis. Because climate change is a global phenomenon and because LNG export authorizations have the potential to alter greenhouse-gas emissions domestically and abroad, DOE reasonably focused its climate-change analysis on this international context. Given fundamental uncertainties regarding U.S. and foreign energy markets, DOE reasonably determined that it cannot feasibly model all changes, including energy displacement effects, relevant to determining whether LNG exports will have a net positive or negative impact on global greenhouse-gas emissions. DOE reasonably determined, however, that it could provide useful information through a comparative analysis with foreign power-generation sources (natural gas and coal) that LNG exports are likely to displace. While Sierra Club advocated different approaches to assessing climate-change impacts, Sierra Club

cannot show that DOE failed to take a hard look or that its approach was unreasonable.

## **B. Natural Gas Act**

Contrary to Sierra Club's argument, DOE also did not act arbitrarily in declining to quantify unforeseeable natural-gas-production and climate change impacts for purposes of its public-interest review. DOE's obligation under Section 3(a) is to consider the relevant factors, not to analyze all factors numerically or with the same methodology. Further, although it cannot meaningfully quantify specific induced-production impacts, DOE reasonably determined, from the record evidence, that such effects will be "incremental" and "modest" in relation to the natural-gas boom that is expected to continue without or without exports. Finally, DOE reasonably concluded that potential adverse environmental effects do not outweigh economic and international-trade benefits or rebut the statutory presumption favoring exports, given the uncertainty surrounding environmental impacts and society's ability to more effectively address such effects directly, *via* federal, state, and local regulation.

## **STANDARD OF REVIEW**

When exercising judicial review under Section 19 of the Natural Gas Act (15 U.S.C. § 717r(b)), including to determine whether DOE orders under the Act comply with NEPA, this Court applies the familiar standard set out in the

Administrative Procedure Act, 5 U.S.C. § 706(2)(A). *See North Baja Pipeline, LLC v. FERC*, 483 F.3d 819, 821 (D.C. Cir. 2007); *see also Del. Riverkeeper Network v. FERC*, 753 F.3d 1304, 1313 (D.C. Cir. 2014). Under that standard, DOE's order must be upheld unless "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). An agency's decision ordinarily will be deemed arbitrary only if the agency failed to consider the relevant factors or made a "clear error of judgment." *Del. Riverkeeper Network*, 753 F.3d at 1313 (quoting *Motor Vehicle Mfrs. Ass'n of the U.S., Inc. v. State Farm Mut. Auto. Ins.*, 463 U.S. 29, 43 (1983)).

When reviewing an agency's NEPA compliance, this Court asks whether the agency has "adequately considered and disclosed the environmental impacts of its action." *Del. Riverkeeper*, 753 F.3d at 1313; *Baltimore Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 97-98 (1983). If this Court determines that DOE has taken a "hard look" at the relevant potential impacts of its action, this Court's review is complete. *See Myersville Citizens for a Rural Community, Inc. v. FERC*, 783 F.3d 1301, 1322 (D.C. Cir. 2015). This Court may not "second-guess substantive decisions committed to [DOE's] discretion," and must likewise defer to DOE's "informed discretion" as to matters within its technical expertise. *Del. Riverkeeper*, 753 F.3d at 1313 (quoting *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 377 (1989)).



## **ARGUMENT**

### **I. DOE COMPLIED WITH NEPA**

#### **A. DOE Took a Hard Look at the Environmental Impacts of Its Order**

DOE's review and approval of the Freeport Liquefaction Project EIS, and its preparation of the Environmental Addendum and Life Cycle Analysis, show that DOE took a hard look at the environmental impacts of authorizing LNG exports from the Freeport Terminal, including indirect and cumulative effects in relation to exports from other approved or proposed LNG export facilities. *See* pp. 14-21, *supra*. As the Supreme Court has explained, NEPA is governed by a "rule of reason, which ensures that agencies determine whether and to what extent" to evaluate environmental impacts "based on the usefulness of any new potential information to the decisionmaking process." *Dep't of Transp. v. Public Citizen*, 541 U.S. 752, 767 (2004) (internal quotation and citation omitted); *see also Myersville Citizens*, 783 F.3d at 459. This "rule of reason" informs, *inter alia*, an agency's evaluation of indirect effects. *See Public Citizen*, 541 U.S. at 767-68. An agency's duty to consider potential impacts that are not closely connected to a proposed action is commensurate with the agency's ability to meaningfully forecast and control such impacts. *Id.*

In its orders, DOE explained that potential indirect effects relating to induced natural-gas production and global climate change are too speculative to be

“reasonably foreseeable” for purposes of NEPA and the applicable NEPA regulation. 40 C.F.R. § 1508.8(b). AR 79 at 84, JA \_\_, AR 87 at 20, JA \_\_.

Whether a potential effect is too remote to be meaningfully evaluated under NEPA is a question entrusted to agency discretion. *See Nat’l Wildlife Fed’n v.*

*Appalachian Reg’l Comm’n*, 677 F.2d 883, 888 (1981) (“The proper scope of an EIS \* \* \* [is] committed to agency discretion”).

DOE did not stop, however, with this determination. To inform its Section 3(a) public-interest review, DOE prepared the Environmental Addendum and the Life Cycle Analysis to disclose and consider: (a) the environmental impacts associated with growth in unconventional natural-gas production attributable to all market forces including potential LNG exports, and (b) the impacts that LNG exports might have on global greenhouse-gas emissions. AR 79 at 84, JA \_\_, AR 87 at 20, JA \_\_. *Id.* DOE made the Addendum and Life Cycle Analysis available for public review and comment in the same manner as the EIS. *See* AR 87 at 20, JA \_\_; *cf.* 40 C.F.R. § 1506.6. The Addendum and Life Cycle Analysis informed DOE’s decisions regarding the proper scope of its environmental review and informed DOE’s broader public-interest review, *see* AR 79 at 46-93, JA \_\_-\_\_, AR 87 at 12-36, JA \_\_-\_\_, in satisfaction of NEPA’s twin goals. *See Sierra Club v. U.S. Army Corps of Eng’rs*, 803 F.3d at 36-37.

Accordingly, contrary to Sierra Club's argument (*Brief* at 32, 49), DOE's NEPA compliance can and should be judged in relation to DOE's entire environmental review, whether or not DOE specifically "argue[d]" that the Addendum or Life Cycle Analysis "played [a] role in satisfying DOE's NEPA obligations."<sup>15</sup> Collectively, DOE's environmental-review documents and orders identified potential environmental impacts, reasonably explained why indirect effects relating to induced natural-gas production and LNG export consumption cannot be specifically forecast, and evaluated such effects to the extent that they meaningfully can be evaluated. This constituted a "hard look" at all concerns raised by Sierra Club.

**B. DOE Took a Hard Look at Possible Environmental Impacts from Export-Driven Natural-Gas Production**

*1. DOE Considered All Relevant Impacts*

In the Environmental Addendum, DOE provided a detailed statement of environmental impacts that might occur as a result of increased shale-gas development and other development of unconventional sources. AR 67, JA \_\_-\_\_.

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<sup>15</sup> Although the Addendum and Life Cycle Analysis were not made part of the EIS filed with EPA for public-notice purposes, *see* 40 C.F.R. §§ 1506.9, 1506.10(a), DOE provided comparable notice and comment proceedings, *see* pp. 17, 20, *supra*. CEQ regulations provide that "trivial violations [should] not give rise to any independent cause of action." 40 C.F.R. § 1500.3; *see also Nevada v. Dep't of Energy*, 457 F.3d 78, 90 (D.C. Cir. 2006) (NEPA claims subject to rule of "prejudicial error," 5 U.S.C. § 706).

As DOE explained, U.S. natural-gas production is expected to rise with or without exports. AR 67 at 2, JA \_\_\_. Because DOE cannot predict, with any reasonable certainty, the extent to which LNG export authorizations will add to increased production or where such production and associated environmental impacts might occur, DOE did not attempt to “identify or characterize the incremental environmental effects” of cumulative export authorizations. AR 79 at 84, JA \_\_\_; *see also* AR 67 at 2, JA \_\_\_. In other words, DOE did not attempt to quantify the marginal additional increase in natural gas development or the air emissions and other environmental impacts associated with this incremental increase in production that would not occur but for LNG exports. *Id.*

That said, DOE did acknowledge that LNG exports could “accelerate” unconventional natural-gas development and fully disclosed the type and nature of environmental impacts associated with such development. For example, with respect to air quality, DOE disclosed that natural-gas wells and other components of production are significant sources of nitrogen oxides (“NO<sub>x</sub>”) and volatile organic compounds (“VOC”), precursors to ground level ozone, a harmful air pollutant. AR 67 at 20-32, JA \_\_\_-\_\_\_. DOE also explained that increased natural-gas production might “create new or expanded \* \* \* non-attainment areas” not meeting national ambient air quality standards for ozone under the Clean Air Act and might

complicate state implementation plans for bringing air quality into compliance with national standards.<sup>16</sup> *Id.* at 27-29, 32, JA \_\_, \_\_.

In its brief, Sierra Club does not identify a single environmental issue relating to natural-gas production that DOE did not identify and consider in the Environmental Addendum. Rather, Sierra Club argues that DOE's largely qualitative analysis was insufficient and that DOE must quantify specific upstream (production) effects and downstream (consumption) effects, even though DOE determined that specific effects cannot reasonably be forecast. Sierra Club's arguments do not withstand scrutiny.

## 2. *DOE Did Not Deny the Foreseeability of Exports*

Sierra Club argues (*Brief* at 42-46) that DOE acted arbitrarily in contending (allegedly) that LNG exports at and above 146 Bcf/yr – the amount authorized in *FLEX II* – are “unforeseeable.” This misstates DOE's decision. As explained *supra*, in *FLEX I* and *FLEX II*, DOE authorized LNG exports from the Freeport Terminal to non-FTA nations in a cumulative amount of 657 Bcf/yr of natural gas, and DOE received various additional applications for similar export authority from other export terminals, which DOE disclosed in the proceedings on FLEX's applications. *See, e.g.*, AR 44 at 4, n. 12. JA \_\_. DOE has approved some of these applications

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<sup>16</sup> *See Miss. Comm'n on Env'tl. Quality v. EPA*, 790 F.3d 138, 145-146 (D.C. Cir. 2015) (describing Clean Air Act program).

and others remain pending.<sup>17</sup> In the Environmental Addendum, DOE acknowledged EIA's projection (in the 2014 Annual Energy Outlook) that U.S. LNG exports will reach 3500 Bcf/yr – approximately 9.6 Bcf/d – by 2029.<sup>18</sup> AR 67 at 43, JA \_\_\_\_.

Contrary to Sierra Club's suggestion (*Brief* at 42-46), DOE did not deny the possibility (and foreseeability) of LNG exports in the amounts authorized or projected.

DOE did observe that authorizing LNG exports does not “guarantee” the completion and operation of export facilities and does not determine the ultimate amount of LNG exports that market conditions will favor. AR 79 at 84, JA \_\_\_\_.

But this statement was not, as Sierra Club implies (*Br.* at 42-46), a decision by DOE to refuse to confront the uncertainty “inherent in all predictions” or to disregard upstream impacts not “guaranteed” to follow LNG export authorization. DOE discussed natural-gas-production impacts *qualitatively* in the Environmental Addendum. This analysis included projections of overall natural-gas production increases, *see* AR 67 at 5, JA \_\_\_\_, and other numerical measures illustrating the

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<sup>17</sup> DOE has received applications for authority to export LNG to non-FTA nations in an aggregate amount equivalent to approximately 50.6 Bcf/d of natural gas. *See* <http://energy.gov/sites/prod/files/2016/03/f30/Summary%20of%20LNG%20Export%20Applications.pdf> (list as of March 18, 2016). As of the date of this filing, DOE has granted final non-FTA authorizations in an aggregate amount equivalent to 11.8 Bcf/d of natural gas. *See id.*

<sup>18</sup> For reasons stated *supra* (p. 37, n.15), there is no force to the Sierra Club's argument (*Brief* at 45) that “these levels of exports were wholly ignored in the EIS.”

potential scale of impacts. *See, e.g., id.* at 11-12, 21-22, 26-30, 33-37, 39-44, 48-50, 66-67, JA \_\_-\_\_, \_\_-\_\_, \_\_-\_\_, \_\_-\_\_, \_\_-\_\_, \_\_-\_\_, \_\_-\_\_. DOE's statement (distinguishing export authorization from actual exports) was merely part of DOE's explanation for declining to quantify the specific impacts associated with export-induced production. *See* AR 79 at 84-85, JA \_\_-\_\_, AR 87 at 15-21, JA \_\_-\_\_.

As DOE explained, the price competitiveness of U.S. LNG in foreign energy markets depends upon numerous factors that are inherently difficult to predict, including the pace of technological change, U.S. and international economic conditions, potential market disruptions, and U.S. and foreign energy and environmental regulations. *See* AR 79 at 84, JA \_\_, AR 87 at 16-17, JA \_\_-\_\_. For these reasons, long-term market projections are "highly uncertain." AR 25 at 3, JA \_\_. As DOE also explained, shale plays and other unconventional sources of natural gas are spread throughout the lower-48 states, AR 67 at 6, JA \_\_, and there is an interconnected pipeline system covering these states, AR 79 at 24, JA \_\_, making every natural-gas-producing region a potential source for meeting export-induced natural gas demand. AR 87 at 19, JA \_\_.

Given "fundamental uncertainties" regarding *both* the extent of foreign demand for U.S.-exported LNG and where production to meet such demand might occur, DOE reasonably determined that it need not attempt to *quantify* environmental impacts at the local or regional level where such impacts would

occur, given the highly speculative nature of such analysis. AR 79 at 84-85, JA \_\_\_-\_\_\_, AR 87 at 16-19, JA \_\_\_. Indeed, even if DOE “could have provided a more rigorous quantitative evaluation, \* \* \* it does not follow that [DOE’s] qualitative analysis was arbitrary and capricious.” *See Western Watersheds Project v. Bureau of Land Mgmt.*, 721 F.3d 1264, 1277 (10th Cir. 2013). The largely qualitative analysis conducted by DOE was reasonable in context and sufficient. *Id.*

### 3. *DOE Reasonably Relied on Public Citizen*

The Supreme Court has repeatedly held that an agency’s duty to evaluate environmental effects under NEPA depends on the existence of “a reasonably close causal relationship” between the relevant action and potential effects, like “the familiar doctrine of proximate cause.” *Public Citizen*, 541 U.S. at 767 (quoting *Metro. Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 774 (1983)). Nonetheless, because the relevant CEQ regulation (40 C.F.R. § 1508.8(b)) does not contain an express “proximate causation requirement,” Sierra Club argues (*Brief* at 50-54) that proximate cause is a “useful analogy” only in cases like *Public Citizen*, which involved effects the agency “ha[d] no ability categorically to prevent,” *see* 541 U.S. at 768, or, like *Metropolitan Edison*, which involved a claimed impact on community psychological health as opposed to an effect on the physical environment. *See* 460 U.S. at 774.



This contention is readily dismissed. “Proximate cause is often explicated in terms of foreseeability \* \* \* ” *Paroline v. United States*, --- U.S. ---, 134 S.Ct. 1710, 1719 (2014); *see also CSX Transp., Inc. v. McBride*, 564 U.S. 685, 701 (2011). The CEQ regulation requires NEPA review only for effects “caused by” agency action and “reasonably foreseeable.” 40 C.F.R. § 1508.8(b). The CEQ regulation therefore effectively codifies a proximate cause requirement.

Moreover, DOE invoked *Public Citizen* not merely for its discussion of proximate cause but also for its discussion of NEPA’s “rule of reason.” *See* AR 87 at 14-15, JA \_\_\_-\_\_\_. The rule of reason derives from the discretion that is afforded to agencies under NEPA’s broad mandates and from the “arbitrary and capricious” standard of judicial review for NEPA compliance. *See Nat’l Comm. for the New River v. FERC*, 373 F.3d 1323, 1330 (D.C. Cir. 2004) (citing *Marsh*, 490 U.S. at 373). Under this Court’s precedents, the rule of reason guides “every aspect” of an agency’s NEPA approach, *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 201 (D.C. Cir. 1991), including agency decisions “setting limits to the scope” of environmental review. *Nat’l Wildlife Fed. v. Appalachian Reg’l Comm’n*, 677 F.2d 883, 889 (D.C. Cir. 1981).

When a proposed action implicates environmental effects that are causally related but in an attenuated fashion, the effects farther removed in space and time not only become increasingly difficult to foresee, they also become increasingly

wider in scope and thus more burdensome and difficult to evaluate. Further, the likelihood of long-term outcomes are often subject to multiple intervening forces, including federal and state regulatory actions that will be subject to their own environmental reviews. Under the “rule of reason,” the nature of the causal relationship between potential impacts and agency action is relevant not only for determining whether a NEPA obligation arises, but also for determining the type and extent of analysis that would be “useful” to the agency’s decisions. *See Public Citizen*, 541 U.S. at 767.

As DOE explained here, export-induced demand for natural gas could induce “some additional production in every producing region in the lower- 48 states.” AR 87 at 19, JA \_\_\_. To require DOE to predict specific impacts on natural resources within every region would impose a heavy burden on DOE with little (if any) value added to DOE’s decisionmaking process. This is so, in part, because DOE lacks authority to directly regulate the environmental effects of natural-gas production, and because potential actions by local, state, and federal authorities in response to proposed new and existing natural-gas production are among the many unknowable and unpredictable variables that render long-term projections highly uncertain. *See id.*

Sierra Club responds (*Brief* at 52) by citing this Court’s statement in *Calvert Cliffs’ Coordinating Comm. Inc. v. U.S. Atomic Energy Comm’n*, 449 F.2d 1109,

1122-23 (D.C. Cir. 1971), that allowing agencies to disregard impacts that are subject to direct regulation by other agencies would cause NEPA to “wither away in disuse.” But *Calvert Cliffs* is inapposite. *Calvert Cliffs* set aside an Atomic Energy Commission rule governing NEPA review of nuclear power-plant applications. *See id.* at 1122-27. The rule classified any plant emission or other operational aspect governed by a federal, state, or regional environmental quality standard as “insignificant” and exempt from NEPA review. *Id.* at 1122. This Court held that the Atomic Energy Commission could not abdicate NEPA review *solely* on the grounds that effects are subject to direct environmental regulation by other federal and state agencies. *Id.* at 1122-23.

DOE did nothing of that sort here. As to export-induced natural-gas production, DOE simply determined that a highly-speculative *quantitative* analysis of impacts across all existing or prospective natural gas-producing regions in the lower-48 states would not produce sufficiently reliable information to be of value to DOE’s public-interest review of FLEX’s export application. Sierra Club has not shown this determination to be arbitrary or contrary to NEPA’s “rule of reason.”

4. *DOE Reasonably Differentiated Between Macroeconomic and Environmental Effects*

As explained *supra*, EIA’s 2012 report projects that LNG exports of 6 to 12 Bcf/d (compared to a baseline of no exports) would increase domestic natural-gas production in an amount equal to 60 to 70 percent of such export volume and that 72

percent of the increase would come from shale gas.<sup>19</sup> Because DOE used a macroeconomic model to project these levels of induced production, Sierra Club argues (*Brief* at 44, 55-57) that it was arbitrary for DOE not to use the same or similar model to predict environmental impacts. This is a *non sequitur*.

Predicting the incremental rise in domestic natural-gas production that would result from an assumed but highly uncertain volume of LNG exports is several steps short of predicting environmental impacts. For example, DOE could project air-pollutant emissions based on an assumed export volume and an assumed level of induced natural-gas production by making additional assumptions about emissions during extraction, transport, and processing. But calculating such uncertain figures on a national basis would say nothing about where emissions might occur or whether the air quality in any particular region would be detrimentally impacted.

Sierra Club's assertion (*Brief* at 59) that "DOE must disclose how many tons of air pollution it expects to be emitted by induced gas production" even if DOE cannot "assess[] \* \* \* the impact of this pollution on air quality" is an *ipse dixit*. Sierra Club fails to explain how it can be arbitrary or contrary to law for DOE to forego an analysis that cannot assess the "impact of [DOE's action] on air quality"

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<sup>19</sup> Sierra Club refers (*Brief* at 33, 57) to EIA's 2014 study (pp. 22-23, *supra*), which projected that LNG exports in amounts up to 20 Bcf/d (as compared to baseline exports specified in EIA's 2014 Annual Energy Outlook) would trigger increased domestic natural-gas production in the amount of 61 to 84 percent of the increased export volume. See AR 72-a at 12, JA \_\_\_\_.

and thus would not inform DOE's public-interest review. As DOE explained, to predict the specific localities where new or enhanced natural-gas production and associated environmental impacts on air quality, water, or other natural systems might occur, DOE would need to model price elasticity of natural-gas production in every natural-gas-producing region in the lower-48 states. *See* AR 87 at 16-18, JA \_\_\_-\_\_\_. Such an analysis would be considerably more speculative than the national-level projections reported by EIA and substantially more burdensome.

#### 5. *DOE Reasonably Addressed Ozone Impacts*

Sierra Club proffers select information from the Environmental Addendum in an effort to show (*Brief* at 51, 63-71) that regional analyses of ozone and air impacts already have been done and would not be "unmanageable or unrealistic." But upon scrutiny, the proffered information illustrates why further analysis is *not* reasonably required. Sierra Club references two air-impact studies summarized in the Addendum: (1) a study of air impacts from natural-gas production in the Haynesville shale play of east Texas and western Louisiana and (2) a study of air impacts from natural-gas production on federal land in Wyoming. *Id.* at 69-70 (citing AR 67 at 28-29, JA \_\_\_-\_\_\_). Because both studies used a common model to assess air impacts in specified air quality control regions, Sierra Club argues (*Brief* at 71) that tools are available for assessing regional air impacts in the present case.

But Sierra Club overlooks the fact that both studies begin with a presumed increase in natural-gas production in a particular geographic region from new or increased development, *see* AR 67 at 28-29, JA \_\_-\_\_, the very information that DOE found that it could not reasonably forecast in the present case. *See* AR 87 at 16-19, JA, \_\_-\_\_. Given “fundamental uncertainties” about modeling price elasticity on the local and regional level, DOE determined that it cannot forecast, with reasonable certainty, which gas-producing regions in the lower-48 states will see production increases and in what amount from assumed LNG exports. *Id.* The studies cited by Sierra Club do not address this point.

The studies and other analysis in the Addendum do show, however, that DOE took a hard look at ozone impacts. DOE specifically disclosed that emissions from increased natural-gas development might “create new or expanded ozone non-attainment areas” and might complicate state implementation plans for bringing air quality into compliance with national standards. *Id.* at 27-29, 32, JA \_\_-\_\_, \_\_. Given DOE’s inability to reasonably predict where and to what extent ozone issues might arise, DOE reasonably determined that additional quantitative modeling of air impacts would not be sufficiently reliable to aid DOE’s public-interest review. *See Public Citizen*, 541 U.S. at 767.

6. *DOE Reasonably Addressed Water Impacts*

DOE also reasonably declined to undertake quantitative modeling of water impacts from export-induced natural-gas production. As part of its discussion of potential impacts from water usage, the Environmental Addendum quantifies water use by the shale-gas industry per unit of energy produced, and as a percentage of overall water usage in various shale-gas regions. *Id.* at 11-12, JA \_\_-\_\_. These data show that shale-gas power generation is less water intensive than most other power generation (including coal, nuclear, oil, fuel-ethanol, and biodiesel), *id.* at 11, JA \_\_, and that the water used in shale-gas production is a small fraction of overall use in shale-producing areas. *Id.* at 12, JA \_\_. For example, in the area of the Marcellus shale (encompassing parts of West Virginia, Ohio, Pennsylvania, and New York) water used in natural-gas production is .06 percent of total water use. *Id.*

Citing the same data set (*Brief* at 64), Sierra Club highlights the one shale-play where water use from gas production is above one percent of total water use; *viz.*, the Eagle Ford shale play (in south Texas), where gas production accounts for approximately three to six percent of water use. *See* AR 79 at 49, JA \_\_; AR 67 at 12, JA \_\_. Sierra Club contends (*id.*) that DOE should have used EIA's NEMS model and other available tools to predict, for Eagle Ford and other shale plays, the additional water use that would be associated with export-induced production.

As DOE explained, however, water use is principally a local issue. AR 67 at 12, JA \_\_\_. Adverse effects are possible, *e.g.*, if there are excessive withdrawals from limited-capacity surface waters or smaller, shallower aquifers. *Id.* But these water resources do not necessarily correspond to shale plays, *see* AR 87 at 18, JA \_\_\_, and limitations in available water would serve as a check on new development. For these reasons, projected production increases, even on a play level, would not be reasonably predictive of future water use from any particular water source. *Id.*

Sierra Club also summarily argues (*Brief* at 65) that DOE has “tools to predict the amount of \* \* \* wastewater” that would be produced, per shale play, from export-induced gas production and that DOE should have developed such data as part of its analysis of water quality impacts. But Sierra Club fails to show how predicting total export-induced wastewater volume, per shale play, would aid in the assessment of impacts to particular water bodies or resources. The Addendum contains a detailed discussion of the impacts of natural-gas production on water quality, including a discussion of the nature of hydraulic-fracturing fluids and the risks that they pose to surface waters and groundwater. *See* AR 67 at 13-19, JA \_\_\_-\_\_\_. This discussion satisfied DOE’s duty to consider indirect impacts to the extent they reasonably can be forecasted. *See* 40 C.F.R. § 1508.8(b).



7. *DOE's Decision Is Consistent with Judicial Precedent*

In arguing (*Brief* at 47, 55-56) that DOE cannot satisfy its NEPA obligations without a quantitative analysis of the possible environmental impacts from export-induced natural-gas production, Sierra Club primarily relies (*see id.* at viii) on two Eighth Circuit cases involving federal approval of a 280-mile rail line designed to serve a Wyoming coal-mining region. *See Mid States Coalition for Progress v. Surface Transp. Board*, 345 F.3d 520, 532 (8th Cir. 2003); *Mayo Found. v. Surface Transp. Board*, 472 F.3d 545, 548 (8th Cir. 2006). Because the rail line's "stated purpose" was to increase the availability and decrease the price of low-sulfur coal, the Eighth Circuit determined that increased coal consumption was reasonably foreseeable and that associated impacts needed to be considered. *See Mid States*, 345 F.3d at 549-550. The Eighth Circuit acknowledged uncertainties in determining where and to what extent increased coal use would occur, but found that an inability to predict the *extent* of potential impacts was no cause for failing to consider the *nature* of the effects. *Id.* at 549.

There is no clear line between an agency's ability to foresee the "extent" of an uncertain impact and the agency's ability to foresee whether the impact will occur. If an agency determines that certain effects are not reasonably foreseeable, the agency's duty to evaluate the "nature" of the effects is not apparent. *See* 40 C.F.R.

§ 1508.8(b).<sup>20</sup> In any event, DOE fully considered and evaluated the *nature* of potential adverse effects from export-induced natural-gas production in the Environmental Addendum and supporting materials. This comports with the holding in *Mid States*. See 345 F.3d at 549-550.

Nor is DOE's analysis inconsistent with *Mayo Foundation*. See 472 F.3d at 554-556. On remand from the Eighth Circuit's decision in *Mid States*, STB elected to model project-induced coal consumption and associated air emissions on a nationwide and regional basis; *i.e.*, in relation to the model's energy supply and demand regions. See *Surface Transp. Board Decision* (Docket No. 33407) (Feb. 13, 2006), 2006 WL 383507, \*7-\*10. But STB declined to analyze impacts on "local" air quality (air quality control regions), citing model limitations and "inherent uncertainties and data gaps." *Id.* at \*9-\*10. In affirming the STB's analysis – over Sierra Club's objection – the Eighth Circuit determined that STB's quantitative analysis was "more than adequate[]," not that no other analysis would do, or that a

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<sup>20</sup> The Eighth Circuit invoked the CEQ regulation regarding "incomplete or unavailable information." *Id.* at 549-550 (citing 40 C.F.R. § 1502.22). This provision applies "[w]hen an agency is evaluating reasonably foreseeable significant adverse effects on the human environment." 40 C.F.R. § 1502.22. On its face, this provision does not apply to the threshold question whether an effect is "reasonably foreseeable" and thus subject to NEPA review. *Id.*; see also 40 C.F.R. § 1508.8(b). DOE nonetheless complied with the directives in § 1502.22 to "make clear" when (and why) relevant information is lacking and to summarize "existing credible scientific evidence \* \* \* relevant to evaluating the reasonably foreseeable significant adverse impacts." See 40 C.F.R. § 1502.22(b)(3).

quantitative analysis is always required however uncertain the potential effects. *See* 472 F.3d at 554-556; *see also Western Watersheds*, 721 F.3d at 1277 (ability to conduct quantitative analysis does not show qualitative analysis to be arbitrary).

At bottom, “the NEPA process involves an almost endless series of judgment calls \* \* \* vested in the agencies, not the courts.” *Coalition on Sensible Transp., Inc. v. Dole*, 826 F.2d 60, 66 (D.C. Cir. 1987). Whether DOE took a “hard look” at the potential effects of natural-gas production induced by the LNG export authorizations at issue is a fact-specific inquiry that depends on the unique circumstances of this case. The touchstone for judicial review is the “rule of reason,” not the outcome of prior cases on different facts.

### **C. DOE Reasonably Addressed Concerns Regarding Impacts from Induced Coal Consumption**

In addition to projecting heightened natural-gas production, EIA’s export studies project that higher demand for natural gas will cause a marginal shift in the domestic electric-power sector from natural-gas generation to coal-fired generation. *See* AR 25 at 6, 12, 18, JA \_\_, \_\_, \_\_. While EIA’s studies also modeled potential changes in domestic CO<sub>2</sub> emissions, including changes related to coal consumption (*see infra*), DOE did not attempt to model impacts on regional air quality or other natural systems, because the causal relationship between LNG export authorizations and domestic coal consumption is “even more attenuated” than the like relationship with natural-gas production, leaving greater uncertainty regarding the projected

effect. AR 87 at 23, JA \_\_\_. To illustrate modeling uncertainty, DOE observed that EIA's projections on coal use are already outdated, because they do not account for regulatory changes, including EPA's 2015 Clean Power Plan. *Id.*

Sierra Club fails to show that this rationale is arbitrary or unreasonable. While Sierra Club notes (*Brief* at 72) that coal combustion is a source of "ozone-forming pollution," Sierra Club does not argue that DOE should have modeled the impacts of induced coal consumption on specific ozone nonattainment areas, water resources, or other natural systems. Such arguments would fail for reasons just stated, namely, an inability to reasonably forecast where and to what extent such impacts might occur. *See* pp. 39-42, *supra*.

As for Sierra Club's concern (*Brief* at 72) regarding greenhouse-gas emissions and the "copious" CO<sub>2</sub> emissions from coal combustion, Sierra Club acknowledges (*Brief* at 72) that DOE has already used EIA's NEMS model to estimate the extent to which LNG exports might increase the nation's energy-related CO<sub>2</sub> emissions, taking into account the projected increases in coal consumption. *See* AR 25 at 19, JA \_\_; AR 72-a at 20-21, JA \_\_-\_\_. While Sierra Club complains (*Brief* at 72) that this modeling did not account for methane and other emissions "upstream in the natural gas lifecycle," this critique is not germane to greenhouse-gas emissions from coal consumption. Moreover, upstream emissions from natural-

gas production needed for LNG exports were considered and evaluated by DOE in the Life Cycle Analysis. *See* AR 79 at 89, JA \_\_\_\_.

Sierra Club similarly misses the mark in arguing (*Brief* at 73-74) that DOE cannot rely on the potential mitigating effect of EPA's Clean Power Plan and other regulations that post-date EIA's modeling. Sierra Club contends (*id.*) that the "accelerated coal and nuclear retirement" scenario modeled in EIA's 2014 study anticipated recent regulatory changes but still projected an increase in CO<sub>2</sub> emissions from induced coal use relating to LNG exports. Even if Sierra Club's understanding of the scenario were accurate (EIA's 2014 study was released before the Clean Power Plan and does not reference EPA regulations, *see* AR 72-a at 5, JA \_\_\_\_), this observation does not show any deficiency in the modeling of CO<sub>2</sub> emissions from coal. The EIA studies model and disclose CO<sub>2</sub> emissions from coal, and DOE considered such emissions in its final order in this case. *See* AR 79 at 89, JA \_\_\_\_.

#### **D. DOE Took a Hard Look at Greenhouse-Gas Emissions**

Sierra Club also fails to show any fundamental flaw in DOE's overall consideration – *via* the EIS, Environmental Addendum, and Life Cycle Analysis – of potential climate change impacts.

1. *DOE Adequately Addressed Domestic Emissions*

Sierra Club argues (*Brief* at 60-63) that DOE provided “no explanation” for “fail[ing] to calculate \* \* \* the amount of greenhouse gases that would be emitted [domestically] by induced natural-gas production, processing, and transport.” This is incorrect. Although DOE did not calculate the precise numbers Sierra Club seeks – summations of the annual upstream emissions from the specific LNG exports authorized in *FLEX II* and/or from LNG exports projected by EIA – DOE did disclose substantial information to enable the public and agency decisionmakers to understand the impact of LNG-export authorizations on greenhouse-gas emissions

As DOE explained on rehearing (AR 87 at 33, JA \_\_), the EIS calculates greenhouse-gas emissions from the construction and operation of the Freeport Terminal, including emissions from the combustion of natural gas in the liquefaction process. *See* AR 56 at 4-211, JA \_\_. In addition, the EIA studies include modeling of energy-related CO<sub>2</sub> emissions across a range of possible LNG export volumes, from 6 Bcf/d to 20 Bcf/d. *See* AR 25 at 19, JA \_\_; AR 72-a at 20-21, JA \_\_-\_\_. As for methane emissions from the extraction and transport of natural gas, the Environmental Addendum details the nature of such emissions and provides a range of estimates of emission rates. *See* AR 87 at 33, JA \_\_. The Life Cycle Analysis then quantifies total cradle-to-grave greenhouse-gas emissions (methane and CO<sub>2</sub>) from LNG exports, per MWh of electricity produced. AR 87 at 33, JA \_\_.

While Sierra Club proffers various additional calculations (*Brief* at 60-63) to estimate domestic upstream greenhouse-gas emissions from the exports authorized in *FLEX II* and projected by EIA, these calculations are based entirely on data *disclosed* by DOE in the Life Cycle Analysis and supporting materials. *See id.*; *see also Brief* at 80-81. Sierra Club's complaint (*Brief* at 62) that the data was not disclosed "in the EIS" puts form over function. *See* p. 37 & n. 15, *supra*.

Moreover, climate change is a *global* phenomenon and the export of LNG occurs on an *international* scale. For these reasons, DOE reasonably elected to undertake a Life Cycle Analysis of greenhouse-gas emissions from LNG exports, instead of quantifying domestic emissions only, as Sierra Club advocated. *See* AR 87 at 32, 34, JA \_\_, \_\_. Indeed, an analysis restricted to domestic emissions arguably would have been arbitrary for disregarding a relevant and important consideration. In contrast, DOE's Life Cycle Analysis accounted for all upstream and downstream greenhouse-gas emissions from LNG production. AR 54 at 1-2, JA \_\_-\_\_.

## 2. *DOE Adequately Addressed Global Emissions*

DOE also reasonably relied on the Life Cycle Analysis as conducted. Sierra Club agrees with DOE (*see Brief* at 74-75) that exported LNG is likely to displace other fuels used to generate electric power. Sierra Club contends (*id.* at 75-76) that DOE acted arbitrarily in declining to provide, in the Life Cycle Analysis, a

comparative analysis of emissions from “wind, solar, or other renewables.” Sierra Club argues (*id.*) that renewable sources of power are just as prevalent in export markets as natural gas.

This argument misapprehends DOE’s analysis. DOE reasonably observed that U.S. LNG exports would immediately compete with other sources of natural gas available in foreign markets because it is the same commodity. AR 87 at 34, JA \_\_\_. This is true whether or not natural gas is already prevalent in particular export markets. *Id.* As for coal, the very figures cited by Sierra Club (*Brief* at 75-76) illustrate its prevalence and show that it is far-and-away the predominant source of power in China and India. For this reason, and in light of international pressures on nations to move away from coal and toward less carbon-intensive energy sources, DOE reasonably determined that a comparison with coal – to determine whether in fact lifecycle emissions of exported LNG would be below those of regional coal – would be useful for evaluating potential impacts on global climate change. AR 87 at 34, JA \_\_\_.

In contrast, it is already known that renewable power generation has a smaller carbon footprint than fossil-fuel power generation. The Life Cycle Analysis is not a macroeconomic analysis and does not predict the extent to which LNG exports might displace other energy sources on a cost basis. Thus, adding renewables to the



Life Cycle Analysis would add no information on the potential displacement of renewables in foreign export markets.

As DOE further explained, to determine displacement effects overall, DOE would need to model macroeconomic impacts in all relevant foreign energy markets. AR 87 at 35, JA \_\_\_\_\_. Such a task would be exceedingly difficult and highly uncertain, given the many variables that cannot reasonably be known or modeled, including foreign regulatory actions that might favor some energy sources over others for reasons unrelated to cost. *Id.* Sierra Club acknowledges the impossibility of undertaking such an effort (*Brief* at 75), but insists that DOE must consider the lifecycle emissions of renewable power generation in any event. This is a *non sequitur*. Sierra Club provides no reason for believing that U.S. LNG exports would significantly displace renewables and suggests no particular additional analysis that would address that question.

## **II. DOE COMPLIED WITH THE NATURAL GAS ACT**

Echoing its NEPA arguments, Sierra Club contends (*Brief* at 77-79) that the failure to quantify adverse environmental effects also dooms DOE's public-interest review under Section 3(a) of the Natural Gas Act. Sierra Club reasons (*id.*) that DOE could not reasonably weigh the expected (quantified) economic benefits of LNG exports against potential adverse environmental effects, or reasonably describe

the environmental effects as “modest,” without specifying what the “environmental costs weigh.” This argument fails for three reasons.

First, the direct effects of constructing and operating the Freeport Terminal, including the effects of liquefying natural gas for export, were quantified in the EIS. *See* pp. 14-16, *supra*. DOE only declined to quantify cumulative indirect environmental impacts that DOE found were not reasonably foreseeable. Given the broad terms of the Natural Gas Act, *see* 15 U.S.C. § 717b(a), and the “general presumption favoring [export] authorization,” *West Virginia Public Services Com’n*, 681 F.2d at 856, the Natural Gas Act cannot be construed as imposing environmental-review obligations greater than those under NEPA.

Second, Sierra Club cites no authority (and there is none) for the proposition that the Natural Gas Act requires a formal cost-benefit analysis where all impacts, beneficial and adverse, must be expressed in common (*e.g.* monetary) terms and tallied to determine a policy outcome. DOE’s duty was to reasonably identify and evaluate the factors relevant to the public interest – including economic, environmental, energy security, and international trade considerations – not to use an identical methodology for each factor considered.

Third, as Sierra Club acknowledges (*Brief* at 78), projected export volumes and associated production increases are fairly described as “incremental” and “modest” relative to the natural-gas production and production increases that are

projected to occur with or without exports to non-FTA nations. In so stating, DOE did not find that associated adverse environmental impacts necessarily will be insignificant. To the contrary, DOE disclosed potentially significant impacts, including, *e.g.*, that new gas developments could lead to new ozone nonattainment areas. AR 67 at 26-32, JA \_\_\_\_-\_\_\_\_.

DOE also explained, however, that Section 3(a) of the Natural Gas Act is “too blunt an instrument” for effectively addressing such concerns, AR 79 at 87, JA \_\_\_\_\_. Given the economic and international-trade benefits of allowing LNG exports, DOE concluded that the “public interest is better served,” by controlling the adverse environmental effects of natural-gas development directly, *via* federal, state, and local regulation. *Id.* at 86-97, JA \_\_\_\_-\_\_\_\_. This conclusion is manifestly reasonable and entitled to deference from the Court.

**CONCLUSION**

For the foregoing reasons, this Court should deny the petition for review and affirm the Department of Energy's orders.

Respectfully Submitted,

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**ADDENDUM: APPLICABLE STATUTES AND REGULATIONS****CONTENTS****PAGE****A. Natural Gas Act**

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40 C.F.R. § 1508.8.....III

## **A. Natural Gas Act**

Section 3 of the Natural Gas Act (15 U.S.C. § 717b) provides, in relevant part, that:

### **(a) Mandatory authorization order**

After six months from June 21, 1938, no person shall export any natural gas from the United States to a foreign country or import any natural gas from a foreign country without first having secured an order of the Commission authorizing it to do so. The Commission shall issue such order upon application, unless, after opportunity for hearing, it finds that the proposed exportation or importation will not be consistent with the public interest. The Commission may by its order grant such application, in whole or in part, with such modification and upon such terms and conditions as the Commission may find necessary or appropriate, and may from time to time, after opportunity for hearing, and for good cause shown, make such supplemental order in the premises as it may find necessary or appropriate.

\* \* \*

### **(c) Expedited application and approval process**

For purposes of subsection (a) of this section, \* \* \* the exportation of natural gas to a nation with which there is in effect a free trade agreement requiring national treatment for trade in natural gas, shall be deemed to be consistent with the public interest, and applications for such importation or exportation shall be granted without modification or delay.

\* \* \*

### **(e) LNG terminals**

(1) The Commission shall have the exclusive authority to approve or deny an application for the siting, construction, expansion, or operation of an LNG terminal. \* \* \*

## **B. National Environmental Policy Act**

42 U.S.C. § 4332 provides, in relevant part, that:

The Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this chapter, and (2) all agencies of the Federal Government shall--

(A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man's environment;

(B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by subchapter II of this chapter, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations;

(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—

- (i) the environmental impact of the proposed action,
- (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
- (iii) alternatives to the proposed action,
- (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
- (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

\* \* \*

40 C.F.R. § 1508.7 (“Cumulative Impact”) provides that:

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.8 (“Effects”) provides that:

Effects include:

- (a) Direct effects, which are caused by the action and occur at the same time and place.
- (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.



**CERTIFICATE OF COMPLIANCE**

I certify that:

1. Pursuant to Fed. R. App. P. 32(a)(7)(C), the attached answering brief is:  
  
Proportionately spaced, has a typeface of 14 points or more and contains  
  
**13,994** words (exclusive of the table of contents, table of authorities,  
  
certificates of counsel, glossary, and addendum).

*May 23, 2016*

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Date

*s/ John L. Smeltzer*

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John L. Smeltzer

**CERTIFICATE OF SERVICE**

I hereby certify that I electronically filed the foregoing *Federal Defendants' Answering Brief* with the Clerk of the Court for the United States Court of Appeals for the District of Columbia Circuit by using the appellate CM/ECF system on **May 23, 2016.**

I certify that all participants in the case are registered CM/ECF users and that service will be accomplished by the appellate CM/ECF system.

*s/ John L. Smeltzer*

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